

## Gravity monitoring project in Mizunami, central Japan - Subsurface structure under the observation station -

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### 1. Introduction

Tono Research Institute of Earthquake Science (TRIES) showed the plan to introduce an absolute gravimeter (FG5 made by Micro-g Inc.) in the Syomasama lot of the Mizunami Underground research laboratory (MIU)

project in the 2003 fiscal year (Tanaka et al., 2002). Though we do not recur to the significance, purpose, and background, the scheme of introducing a superconducting gravimeter instead of an absolute gravimeter has emerged by recent announcement of a new superconducting gravimeter (Field SG made by GWR Inc.). The FieldSG realizes low-drift less than 1 microGal/month and no refilling of liquid helium, although the dewar size is 10L (30kg in weight). Even if either gravimeter will be introduced, it is important to investigate subsurface structure just under and around the observation point in the Syomasama lot. In this report, we clarify the subsurface structure above basement rock by combining microgravity survey executed by this study and existing data (boring and reflection surveys).

### 2. Microgravity survey

Our study area limits the scope of the investigation to a rectangle 300 meters in EW direction and 700 in NS. For the geologic feature, the Mizunami group (Tertiary layer) covers the granite which forms the basement rock and quaternary deposit distributes thinly along a dale. Gravity survey points reached 141 pts, and the Bouguer anomaly with terrain correction are obtained (for detail procedure, see Tanaka et al., 2001). The Bouguer density, 1.6 g/cc is determined by measurement of rock samples and gravity-topography correlation analysis. Finally, the Bouguer anomaly is divided by 3 components of long wavelength, short wavelength, and noise by frequency filter.

### 3. Existing data

The Japan Nuclear Cycle development institute (JNC) carried out boring exploration and seismic prospecting in the Syomasama lot (JNC, 2001). Both data include information of basement rock depth. According to these data, upper side of basement rock is around 100m depth from the surface in the northern half of study area, it becomes half depth in the southern part, and it reaches near the surface in the southern tip. In addition, well logging was performed and made use of ground water analysis.

### 4. Results

A linear relationship between the long wavelength component of microgravity and basement rock depth by boring and reflection surveys are recognized. On the other hand, the short wavelength component is so correlative with the topographic feature of dale and then seems to be correspond to density interface between the Mizunami group and quaternary deposit.

### 5. Gravity monitoring observation station

The gravity monitoring observation station is planned to install in cave hole dug in the Mizunami group at the southern tip of the Syomasama lot. We are going to prepare the gravity monitoring by compiling groundwater level monitoring data observed near here and underground structure (hydrology structure) in future.

### Reference

Tanaka et al.(2001), Zishin2, 54, 319-330. (in Japanese)

Tanaka et al.(2002), 98th meeting of the Geodetic society of Japan Programme and abstracts, 211-212. (in Japanese)

JNC (2001), Mizunami Underground Research Laboratory Project results from 1996-1999 period. (in Japanese)